

Application Serial No.: 09/683,496

Attorney Docket No.: 57761.000185
Client Reference: 03GP-8046

drawings must show every feature of the invention specified in the claims. The Office Action asserts that the air-cooled devices proximate to the one of more electrical protective devices provided with improved cooling efficiency (claim 16) must be shown or the features canceled from the claim, and that no new matter should be entered. This objection is respectfully traversed.

Claim 16 recites the apparatus of claim 1, wherein air-cooled devices proximal to the one or more electrical protective devices are provided with improved cooling efficiency. It is submitted that such feature is indeed shown in Fig. 5 of the drawings and discussed in the specification at paragraph 45, for example. That is, Fig. 5 shows fuses 12 nearby the power converter 44. Further, the specification describes: "As a consequence, nearby devices no longer have to compete with the fuses 12 for cooling air, and the ambient air cools the nearby devices more efficiently than in a system not employing the present invention." Further, the subject matter shown in the drawings, which relate to this feature, have been further added to the specification. It is submitted that all the claimed features are shown in the drawings.

II. THE CLAIMS SATISFY THE REQUIREMENTS OF 35 U.S.C. §112

The Office Action rejects claim 16 under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The Office Action asserts that neither specification nor drawings comprise any explanation about the structure of the air-cooled devices proximate to the one or more electrical protective devices provided with improved cooling efficiency. This rejection is respectfully traversed.

Claim 16 recites the apparatus of claim 1, wherein air-cooled devices proximal to the

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one or more electrical protective devices are provided with improved cooling efficiency. It is submitted that such features are shown in Fig. 5 of the drawings and set out in paragraph 45, for example, as is discussed in Section I above, so as to enable one skilled in the art to make and/or use the invention. Withdrawal of the rejection under 35 U.S.C. §112, first paragraph, is respectfully requested.

III. THE OBJECTION TO THE CLAIMS

The Office Action objects to the claims asserting minor informalities. Claims 2 and 24 have been amended in response to the objections set out in the Office Action. Withdrawal of the objection of claims 2 and 24 is respectfully requested.

IV. THE CLAIMS DEFINE PATENTABLE SUBJECT MATTER

A. The 35 U.S.C. §102 Rejection based on Gaia

The Office Action rejects claims 1-5, 7-8, 13-14, 18-27, 29, 35 and 39-46 under 35 U.S.C. §102(b) as being unpatentable over U.S. Patent No. 4,375,630 to Gaia. The rejection is respectfully traversed.

Claim 1 recites an apparatus for cooling one or more electrical protective devices mounted to at least one electrical terminal, the apparatus comprising: *one or more coolant passages being thermally-conductive with at least one electrical terminal*; and one or more coolant sources, connected to the one or more coolant passages, for passing coolant fluid through the one or more coolant passages, whereby the at least one electrical terminal is cooled.

The Office Action asserts that Gaia teaches an apparatus 10, Figs. 1-6, for cooling a fuse array mounted between two electrical terminals comprising: coolant passages 12 being thermally-conductive attached (soldered) to each of the electrical terminals 14 between fuse

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columns such that the coolant passages divide each of the electrical terminals 14 into approximately equally sized zones; and grouping of fuses 20 attached to and disposed respectively intermediate the two electrical terminals 14 in each of the approximately equally sized regions. The Office Action further asserts that Gaia teaches that each fuse 20 has opposes longitudinal ends 30 each being mounted to the electrical terminal 14; there are two coolant sources (col.3, lines 48-60) connected to the coolant passages 12 through non-conductive (plastic) conduits.

These assertions set out in the Office Action are respectfully traversed. It is respectfully submitted that the assertions in the Office Action contain mischaracterizations of the teachings of Gaia.

As noted above, the Office Action asserts that Gaia teaches an apparatus 10 for cooling a fuse array mounted between two electrical terminals comprising coolant passages 12 being thermally-conductive attached (soldered) to each of the electrical terminals 14 between fuse columns such that the coolant passages divide each of the electrical terminals 14 into approximately equally sized zones. As an initial point, Applicant submits that element 14 of Gaia is not an electrical terminal, but rather end bells 14. The end bells 14 are in turn provided with a blade-like terminal 16, as described in column 2, lines 46-47.

Further, the Office Action incorrectly asserts that each fuse 20 has opposing longitudinal ends 30 each being mounted to the electrical terminal. Gaia does not teach that the tube fuses 20 have the longitudinal ends, but rather that fasteners 12 have hollow studs 30 (column 2, line 67).

To explain further with particular reference to Gaia, in column 2, lines 26-41, Gaia describes that Figs. 1-3 illustrate a multiple element fuse 10 according to the Gaia invention,

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and that the multiple element fuse 10 comprises a pair of metallic end bells 14 and a plurality of current carrying fusible elements, illustrated as cylindrically shaped tube fuses, each designated by the numeral 20. Gaia explains that the ends of the tube fuses are joined by solder 40 (Fig. 3) to the inside surface 22 of metallic end bells 14. Gaia further teaches that also connected between metallic end bells 14 are a pair of fasteners 12 having the same general dimensions as tube fuses 20.

Gaia further describes in column 3, lines 48-60, that to further enhance the operation of the high capacity multiple element fuse 10 of Gaia, mounting means 30 of fasteners 12 may be provided with a central opening 32. Gaia explains that being tubular, insulating ceramic body 24 of fastener 12 has a central hollow portion 36 and hence can serve as a conduit for the passage of fluid coolant therethrough; and that once fuse 10 is installed, fluid connections may be made to the ends of mounting means 30, such as, for example, by copper or plastic tubing to carry fluid coolant from a remote source to multiple element fuse 10. Gaia teaches that such arrangement and capability is particularly advantageous for very high current capacity fuses which are continuously operated very near their rated capacity.

Claim 1 clearly recites *one or more coolant passages being thermally-conductive with at least one electrical terminal*. Gaia teaches terminals 16 that are provided on end bells 14, in contrast to the incorrect assertion in the Office Action that the coolant passages 12 being thermally-conductive attached (soldered) to "each of the electrical terminals 14." Gaia fails to teach or suggest such claimed feature of one or more coolant passages being thermally-conductive with at least one electrical terminal. It is submitted that the fasteners 12 of Gaia (with a conduit for the passage of fluid coolant) do not constitute one or more coolant passages being thermally-conductive with the Gaia terminal 16. Gaia makes no mention of

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cooling the terminal 16 in this manner, and Gaia does not teach this claimed structure.

Accordingly, it is submitted that based on the mischaracterizations of the Office Action and the deficiencies in the teachings of Gaia, claim 1 defines patentable subject matter. Further, independent claims 23, 42, 43 define patentable subject matter for reasons similar to those set forth above with respect to claim 1.

Claim 20 recites an apparatus for cooling a fuse array mounted between two electrical terminals comprising *at least one coolant passage being attached to each of the electrical terminals such that the coolant passage divides each of the electrical terminals into approximately equally sized regions; and groupings of fuses attached to and disposed respectively intermediate the two electrical terminals in each of the approximately equally sized regions*, thereby interconnecting the electrical terminals.

As noted above, the Office Action asserts that Gaia teaches an apparatus for cooling a fuse array mounted between two electrical terminals comprising coolant passages 12 being thermally-conductive attached (soldered) to each of the electrical terminals 14 between fuse columns such that the coolant passages divide each of the electrical terminals 14 into approximately equally sized zones; and grouping of fuses 20 attached to and disposed respectively intermediate the two electrical terminals 14 in each of the approximately equally sized regions. However, these assertions are deficient in that, for example, Gaia's element 14 is an end bell and not an electrical terminal as asserted in the Office Action.

Gaia in no way teaches the feature of at least one coolant passage being attached to each of the electrical terminals such that the coolant passage divides each of the electrical terminals into approximately equally sized regions; and groupings of fuses attached to and disposed respectively intermediate the two electrical terminals in each of the approximately

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equally sized regions, as recited in claim 20. The terminal 16 of Gaia is not so divided so as to teach claim 20. Gaia simply teaches that the fastener 12 has a central hollow portion 36 and hence can serve as a conduit for the passage of fluid coolant therethrough; and that once fuse 10 is installed, fluid connections may be made to the ends of mounting means 30, such as, for example, by copper or plastic tubing to carry fluid coolant from a remote source to multiple element fuse 10. Such structure of Gaia does not teach the coolant passages divides each of the electrical terminals into approximately equally sized regions, as recited in claim 20.

Accordingly, it is respectfully submitted that Gaia fails to teach or suggest all the features of claim 20. Further, independent claim 41 defines patentable subject matter for reasons similar to those set forth above with respect to claim 20.

For at least the above reasons, Applicant respectfully submits that the independent claims define patentable subject matter. The dependent claims variously depend from the independent claims and therefore also define patentable subject matter for the reasons set forth above with respect to the independent claims, as well as for the additional features such dependent claims recite.

It is respectfully submitted that claims 1-5, 7-8, 13-14, 18-27, 29, 35 and 39-46 define patentable subject matter. Reconsideration and withdrawal of the rejection under 35 U.S.C. §102 is respectfully requested.

B. The 35 U.S.C. §103 Rejection based on Gaia

The Office Action rejects claims 6, 9-12, 15, 28, 30-34, 36 and 37 under 35 U.S.C. §103 as being unpatentable over Gaia. The rejection is respectfully traversed.

The teachings of Gaia are discussed above. It is respectfully submitted that Gaia fails

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to teach or suggest the features of the corresponding independent claims for the reasons set out above and that the dependent claims further define patentable subject matter for the additional features they recite. Accordingly, withdrawal of the rejection under 35 U.S.C. §103 is respectfully requested.

C. The 35 U.S.C. §103 Rejection based on Gaia and Go

The Office Action rejects claims 17 and 38 under 35 U.S.C. §103 as being unpatentable over Gaia in view of U.S. Patent No. 5,144,531 to Go et al. (Go). The rejection is respectfully traversed.

The Office Action asserts that Gaia teaches all the limitations of the claims except said apparatus further comprises one or more heat exchangers interposed with the one or more coolant passages for cooling the coolant fluid. The Office Action asserts that Go teaches an electronic apparatus liquid cooling system, Fig.1, comprising a heat exchanger 11 interposed with the coolant passage for cooling the coolant fluid.

The Office Action further asserts that it would have been obvious to one skilled in the art at the time invention was made to employ a heat exchanger interposed with a coolant passage as it is shown by Go in the device by Gaia in order to enhance the heat dissipation.

Applicant acknowledges that Go teaches the well known use of a heat exchanger. However, it is submitted that even if it were obvious to somehow combine the teachings of Go, and the disclosed heat exchanger, with the apparatus of Gaia, such combination would fully fail to cure the deficiencies of Gaia, as discussed above.

Accordingly, it is respectfully submitted that claims 17 and 38 define patentable subject matter for the reasons discussed above with respect to the corresponding independent claims, as well as for the additional features claims 17 and 38 recite. Withdrawal of the

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rejection under 35 U.S.C. §103 is respectfully requested.

V. CONCLUSION

For at least the reasons outlined above, Applicant respectfully asserts that the application is in condition for allowance. Favorable reconsideration and prompt allowance of the claims are respectfully solicited.

Should the Examiner believe anything further is desirable in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicant's undersigned representative at the telephone number listed below.

For any fees due in connection with filing this Response the Commissioner is hereby authorized to charge the undersigned's Deposit Account No. 50-0206.

Respectfully submitted,
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Attachments:
Appendix

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AppendixMarked Up Version Of Replacement Paragraphs As Per 37 C.F.R. § 1.121

[0045] In addition to providing the aforementioned electrical benefits, the present invention also may provide other benefits with regard to waste heat evacuation and reuse. For example, it has been found that fuses 12 being cooled by the present invention deposit less waste heat into the air surrounding the fuses than conventional air-cooled fuses. As a consequence, nearby devices no longer have to compete with the fuses 12 for cooling air, and the ambient air cools the nearby devices more efficiently than in a system not employing the present invention. For example, Fig. 5 shows fuses 12 nearby the power converter 44. Improving the cooling of the nearby devices may increase their service life and operating performance, and may provide other benefits. These benefits may be particularly valuable when the fuses 12 and other electrical devices are encased in a cabinet or other housing having relatively restricted airflow.

Marked Up Version Of Replacement Claims As Per 37 C.F.R. § 1.121

2. (Once amended) The apparatus of claim 1, wherein at least one of the one or more electrical protective devices is a fuse array comprising two [one] or more fuses.

24. (Once amended) The method of claim 23, wherein at least one of the one or more electrical protective devices is a fuse array comprising two [one] or more fuses.

- END OF APPENDIX -

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